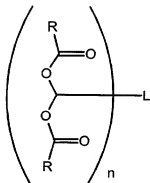


WHAT IS CLAIMED IS:

1. A *gem*-diester having the structure:



wherein:

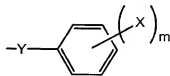
L is optionally substituted hydrocarbyl, hydrocarbylene, heteroatom-containing hydrocarbyl, or heteroatom-containing hydrocarbylene,

each R is independently selected from optionally substituted hydrocarbyl or heteroatom-containing hydrocarbyl, and

n is 1 or 2,

with the proviso that said *gem*-diester has at least two units of ethylenic unsaturation.

2. A *gem*-diester according to claim 1, wherein L is optionally substituted hydrocarbyl.
3. A *gem*-diester according to claim 2, wherein L is optionally substituted aryl.
4. A *gem*-diester according to claim 3, wherein L is:



wherein:

Y is optional and if present is C₁ to C₆ alkylene or alkenylene,

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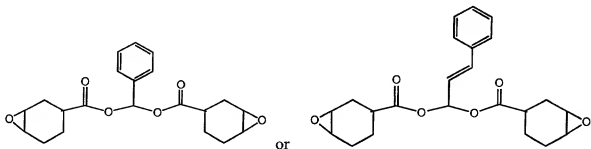
X, when present, is alkyl, alkenyl, haloalkyl, hydroxy, alkoxy, mercapto, heterocyclic, aryl, alkaryl, alkenyloxy, heteroaryl, aryloxy, halogen, cyano, nitro, amino, amido, C(O)H, acyl, oxyacyl, carboxyl, carbamate, sulfonyl, sulfonamide, or sulfuryl, and m is 0-5.

5. A *gem*-diester according to claim 4 wherein m is 0.
6. A *gem*-diester according to claim 5 wherein each R is cycloalkenyl.
7. A *gem*-diester according to claim 4 wherein X is alkyl, alkenyl, alkenyloxy, aryl, or alkaryl.
8. A *gem*-diester according to claim 7 wherein each R is cycloalkenyl.
9. A *gem*-diester according to claim 1 wherein n is 2.
10. A *gem*-diester according to claim 9, wherein each R is cycloalkenyl.
11. A *gem*-diester according to claim 1, wherein L is optionally substituted aliphatic hydrocarbyl.
12. A *gem*-diester according to claim 11, wherein L is optionally substituted alkyl, alkenyl, cycloalkyl, or cycloalkenyl.
13. A derivative of a *gem*-diester according to claim 1, wherein said units of ethylenic unsaturation are epoxidized.

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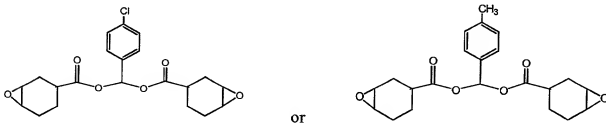
14. A derivative of a *gem*-diester according to claim 4, wherein said units of ethylenic unsaturation are epoxidized.

15. An epoxidized derivative of a *gem*-diester according to claim 6 having the following structure:



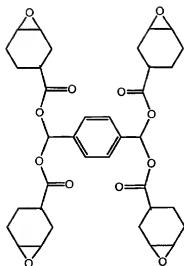
or a ring-substituted derivative thereof.

16. An epoxidized derivative of a *gem*-diester according to claim 8 having the following structure:



or a ring-substituted derivative thereof.

17. An epoxidized derivative of a *gem*-diester according to claim 10 having the structure:



or a ring-substituted derivative thereof.

18. An adhesive composition comprising a *gem*-diester according to claim 1, at least one polymerization promoter, and optionally, a filler.

19. An adhesive composition comprising a *gem*-diester according to claim 4, at least one polymerization promoter, and optionally, a filler.

20. An adhesive composition according to claim 19, wherein said polymerization promoter is a free-radical curing agent, a hydrosilation agent, or a polythiols.

21. An adhesive composition according to claim 20, wherein said polymerization promoter is a free-radical curing agent.

22. An adhesive composition according to claim 21, wherein said free-radical curing agent is a peroxide.

23. An adhesive composition comprising a compound according to claim 13, at least one polymerization promoter, and optionally, a filler.

24. An adhesive composition comprising a compound according to claim 23, comprising at least two polymerization promoters.

25. An adhesive composition according to claim 24, wherein said polymerization promoters are curing agents, catalysts, or initiators.

26. An adhesive composition according to claim 25, wherein said curing agent is an anhydride, imidazole, amine, or carboxylic acid.

27. An adhesive composition according to claim 25, wherein said catalyst is an amine, hydrazine, dicyandiamide, or urea.

28. An adhesive composition according to claim 25, wherein said initiator is an alkylene glycol.

29. An adhesive composition according to claim 28, wherein said alkylene glycol is ethylene glycol or propylene glycol.

30. An adhesive composition comprising an epoxide compound according to claim 14, at least one polymerization promoter, and optionally, a filler.

31. An adhesive composition comprising an epoxide compound according to claim 30, comprising at least two polymerization promoters.

32. An adhesive composition according to claim 31, wherein said polymerization promoters are curing agents, catalysts, or initiators.

33. An adhesive composition according to claim 32, wherein said curing agent is an anhydride, imidazole, amine, or carboxylic acid.

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34. An adhesive composition according to claim 32, wherein said catalyst is an amine, hydrazine, dicyandiamide, or urea.

35. An adhesive composition according to claim 32, wherein said initiator is an alkylene glycol.

36. An adhesive composition according to claim 35, wherein said alkylene glycol is ethylene glycol or propylene glycol.

37. An adhesive composition according to claim 24, wherein said polymerization initiators comprise in the range of about 0.1 weight % up to about 1.0 weight % of the total composition.

38. An adhesive composition according to claim 37, wherein said polymerization initiators comprise in the range of about 0.1 weight % up to about 0.5 weight % of the total composition.

39. An adhesive composition according to claim 23, wherein reaction products of said composition are reworkable.

40. An adhesive composition according to claim 30, wherein reaction products of said composition are reworkable.

41. An adhesive composition according to claim 23, wherein reaction products of said composition are acid-cleavable.

42. An adhesive composition according to claim 23, wherein reaction products of said composition are base-cleavable.

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43. An adhesive composition according to claim 30, wherein reaction products of said composition are acid-cleavable.
44. An adhesive composition according to claim 30, wherein reaction products of said composition are base-cleavable.
45. An adhesive composition according to claim 23, wherein reaction products of said composition are thermally cleavable.
46. An adhesive composition according to claim 30, wherein reaction products of said composition are thermally cleavable.
47. An adhesive composition according to claim 23, further comprising a reactive diluent.
48. An adhesive composition according to claim 30, further comprising a reactive diluent.
49. A method for adhesively attaching a device to a substrate, said method comprising dispensing an adhesive composition according to claim 23 onto a substrate and/or a device or between said substrate and said device to form an assembly, and exposing the assembly to conditions sufficient to cure the adhesive.
50. A method for removing an adhesively attached device from a substrate, said method comprising exposing an adhesive composition according to claim 23 positioned between said substrate and said device to temperatures in the range of about 200 °C up to about 260 °C, and removing said device from said substrate.

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51. A method for adhesively attaching a first article to a second article, said method comprising:

- (a) applying a composition according to claim 23 to said first article,
- (b) bringing said first and second article into intimate contact to form an assembly wherein said first article and said second article are separated only by the adhesive composition applied in step (a), and thereafter,
- (c) subjecting said assembly to conditions suitable to cure said adhesive composition.

52. An assembly comprising a first article reversibly adhered to a second article by cured reaction products of the adhesive composition according to claim 23.

53. An assembly produced by the method according to claim 49.

54. An assembly produced by the method according to claim 51.

55. A method for the preparation of an epoxidized *gem*-diester, comprising

a) contacting an aldehyde with an anhydride, wherein the aldehyde and the anhydride combined have at least two units of ethylenic unsaturation, in the presence of an acid under conditions suitable to allow an addition reaction to occur between said aldehyde and said anhydride, and

b) contacting the product of step (a) with an oxidizing agent under conditions suitable to epoxidize said units of ethylenic unsaturation.

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